

INDIANA STATE DEPARTMENT OF HEALTH
Report on Fireworks-Related Injuries
March 2006 – July 2006

Through the passage of House Enrolled Act 1131, the Indiana State Department of Health (ISDH) received injury reports resulting from fireworks and/or pyrotechnics during 2003 and 2004. However, no reporting occurred in 2005 due to the expiration of this law. With the passage of Public Law 187 in 2006, reporting of fireworks-related injuries was reinstated, with the reporting requirements being identical to those in the previous statute. This report presents fireworks injuries data compiled from March 31-July 31, 2006. It describes the types of injuries and provides age-specific information for 2006, with a comparison of data from 2003, 2004, and 2006.

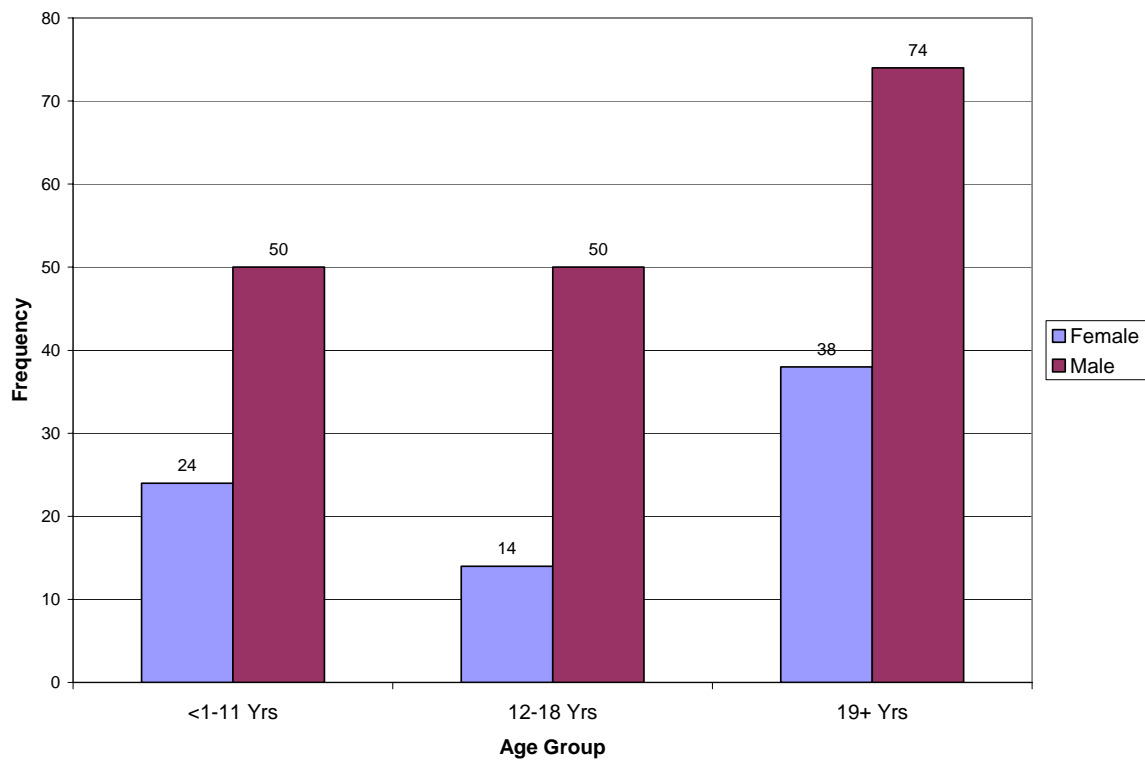
Highlights for 2006

- As of July 31, 2006, 251 unduplicated cases of fireworks-related injuries were reported to the ISDH.
- Fifty-five percent of all reported fireworks-related injuries involved children and adolescents, who represent a fourth of Indiana's population (as of July 1, 2004).
- Seventy-three percent of cases reported burn injuries, with burns of the hands being the most common type of injury.
- One out of every four reported injuries involved the eyes, with 97 percent of those with eye injuries not using any method of eye protection.
- Twenty-three percent of injured persons required either hospital admission or specialized care for burns or eye injuries.
- Eleven percent (28 cases) of injured persons were admitted to a hospital in 2006, compared to 6 percent in 2004.
- Sparklers, rockets, and firecrackers were associated with 58 percent of all reported injuries.
- Mishandling, malfunction, or errant path of fireworks accounted for 70 percent of all those injured.
- Fireworks use on private property accounted for 86 percent of reported injuries.

Age and Gender

- **Seventy percent (175 cases) of reported injuries involved males and 30 percent (76 cases) involved females.** Across all age groups, males reported more fireworks-related injuries than females (Figure 1).
- **Eighty-two percent (205 cases) of injuries occurred among Whites, and Black/African Americans accounted for 13 percent (33 cases) of all injuries.**
- **The median age of those injured was 17 years.** The average age of all injured persons was 21 years with an age range from 11 months to 67 years.

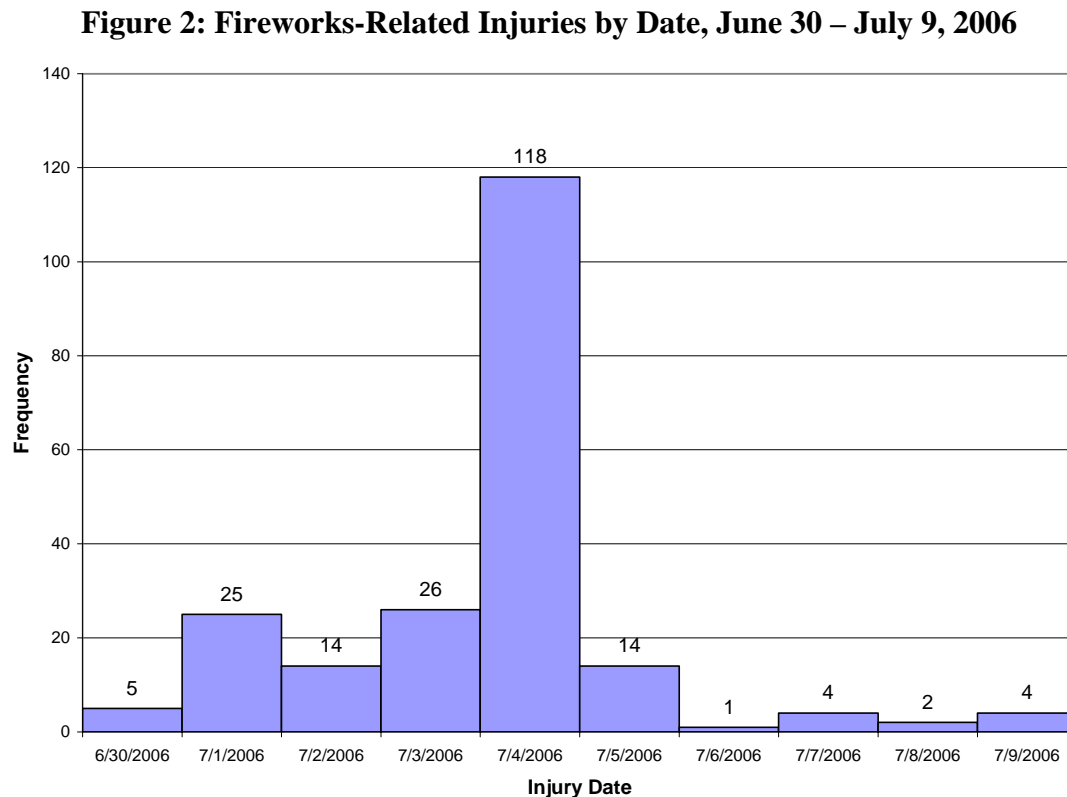
Figure 1: Fireworks-Related Injuries by Age and Gender, Indiana 2006



N = 250 (One case missing age information)

Date of Injuries

- **Eighty-five percent (213 cases) of all reported injuries occurred between June 30 and July 9, 2006** (Figure 2). Forty-seven percent (118 cases) of injuries occurred on July 4, 2006.



Type of Fireworks Involved in Injuries

- **Sparklers, rockets, and firecrackers accounted for 58 percent of injuries** (Table 1). Many other types of fireworks causing injury were reported, including mortars, smoke bombs, spinners, missiles, roman candles, and fountains. Although 29 percent (72 cases) of the reports noted that the injury resulted from mishandling fireworks, 41 percent (104 cases) reported that the injury resulted from fireworks malfunction or an errant path of a rocket.

Table 1: Frequency and Percent of Fireworks Type Involved in Injury (all injuries)

Type of Fireworks / Pyrotechnics	Frequency	Percent
Rockets (i.e., bottle rockets)	49	20%
Sparklers	50	20%
Firecrackers	44	18%
Aerial Devices	28	11%
Twister / “Jumping Jacks”	3	1%
Homemade, altered devices	0	0%
Pyrotechnics*	4	1%
Roman Candles	14	6%
Unspecified / Unknown / Other	59	23%
Total	251	100%

*Alleged pyrotechnics reported to the State Fire Marshal’s office for further investigation.

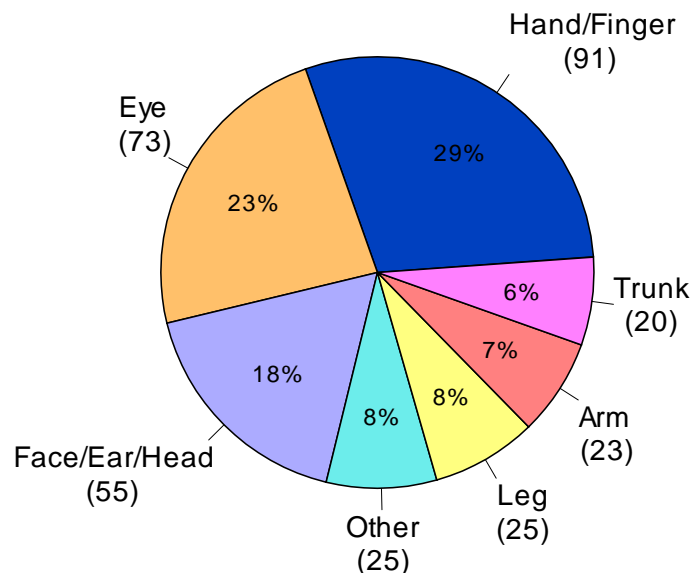
Type of Injuries

- Seventy-three percent (182 cases) of cases experienced burn injuries. Of these, forty-eight percent (121 cases) reported second-degree burns. Seventeen cases reported third-degree burns. Other types of injuries included contusions/lacerations/abrasions (57 cases), penetrating foreign body/missiles (13 cases), puncture wounds (10 cases), and sprains/fractures (4 cases).

Body Part Injured

- Fifty-two percent (164 cases) of all injuries involved the hands or eyes (Figure 3). Injuries to the face, ears, and head accounted for 18 percent of all reported injuries.

Figure 3: Areas of the Body Injured by Fireworks, Indiana 2006



Other Information

- **Sixty-three percent (159 cases) of injuries occurred at the injured person's private home, yard, or property.** A friend/neighbor/relatives' home or property was involved in 22 percent (56 cases) of injuries; public or school property was noted for 8 percent (21 cases).
- **Ninety-one percent of all reports did not provide information on alcohol consumption.** Nine percent (23 cases) stated alcohol was related to the injury and 15 of these cases reported alcohol use within three hours of the injury. Seven cases reported alcohol use by other people at the scene.
- **Seventeen percent (42 cases) of all people injured were bystanders.**
- **Among those injured who were less than 18 years of age, 64 percent (83 cases) of injuries happened while in the presence of an adult.**

Year Comparisons (2003, 2004, and 2006)

For all three years, burns were the most reported fireworks-related injury, accounting for over 60 percent of all injuries (Table 3). Although burns increased slightly from 67 percent in 2004 to 73 percent in 2006, the increase was not significant ($p=0.22$). After hand injuries, eyes were the second most reported area of the body harmed by fireworks. The proportion of reported eye injuries increased significantly from 17 percent in 2003 to 25 percent in 2004 ($p=0.01$); however from 2004 to 2006 the slight increase (to 29%) was not statistically significant ($p=0.53$).

The proportion of people with fireworks-related injuries admitted to the hospital increased in 2006, when compared to 2003 and 2004. The increase from 5 percent in 2004 to 11 percent (28 people) in 2006 was significant ($p<0.05$).

Across all three years, the types of fireworks causing most injuries (sparklers, rockets, and firecrackers) and the reasons for injury (mishandling, errant path, and malfunctioning) did not change significantly ($p>0.05$).

Table 3 compares percentage of fireworks-related injury categories by year.

Table 3: Comparison of 2003, 2004, and 2006 Data

Category	2003 ⁽ⁿ⁼²⁶¹⁾	2004 ⁽ⁿ⁼²³³⁾	2006 ⁽ⁿ⁼²⁵¹⁾
Demographics			
Median Age/Range	18 (0-74 yrs)	18 (0-72 yrs)	17 (0-67 yrs)
Children/Adolescents	53%	52%	55%
Males	73%	76%	70%
Females	27%	24%	30%
White	84%	87%	82%
Black or African American	10%	8%	13%
Injury Type			
Burns	76%	67%	73%
Body Part Injured			
Hand	34%	32%	36%
Eye	17%	25%	29%
Injury Circumstances			
Injured on Private Property	83%	89%	86%
Cases with No Eye Protection	82%	88%	97%
Children Injured with Adults Present	60%	50%	64%
Received Specialized Care for Burn or Eye Injuries	8%	19%	12%
Hospitalized	3%	6%	11%
Fireworks Circumstances			
Injuries from Sparklers, Rocket, and Firecrackers	63%	64%	58%
Injuries from Mishandling Firework	27%	23%	29%
Errant Path or Malfunctioning Firework	21%	37%	41%

Source: ISDH, Injury Prevention Program

SUMMARY OF 2006 DATA

For the 251 cases of fireworks-related injuries that comprise this report, 85 percent (213 cases) occurred during a 10 day period surrounding July 4, 2006, including 47 percent (118 cases) of injuries that took place on Independence Day. While those injured ranged in age from 11 months to 67 years, children and adolescents comprised more than one-half (55 percent) of reported cases. According to the 2004 U.S. Census population estimates for Indiana, persons under 18 years of age represent a fourth of the population. Adults were present 64 percent (83 cases) of the time for injuries reported in children and adolescents. Males were involved in 70 percent of all reported cases, which is a common finding for many traumatic injuries. The racial distribution of those injured was similar to that of the population of Indiana.

As expected, burns were the most frequent type of injury, involving 73 percent (182 cases) of all reported cases and 59 percent of all injuries. While the hands were the part of the body most commonly injured (36 percent), injuries to the eye (29 percent) were also frequent.

Bystanders were injured in 17 percent (42 cases) of reported cases. Hospital admission was needed for 11 percent of those injured, with an additional 12 percent requiring specialized care for either burn or eye injuries. There were no deaths reported related to fireworks injuries during the time period of this report.

When the location of the activity using fireworks was identified, 86 percent (215 cases) of reported cases occurred at private homes, yards, or properties (self-owned, friend, neighbor, or relative). The type of fireworks involved in injuries varied somewhat by age. Sparklers were the leading cause of injuries in young children, rockets caused the most injuries in adolescents, and injuries in adults primarily involved sparklers, closely followed by firecrackers and aerials.

Mishandling, malfunction, or errant path of fireworks was the most frequent mechanism reported for fireworks-associated injury, accounting for 70 percent of all those injured. Alcohol use was not stated for 91 percent of the reported cases. Of the 9 percent reporting use of alcohol, 96 percent reported alcohol use occurred at activities affecting injured adults.

APPENDIX

Age-Specific Fireworks-Related Injuries

This section of the report describes the characteristics of the reported injuries for three specific age groups: 1) children (birth -11years of age), 2) adolescents (12-18 years of age), and 3) adults (19 years and older).

CHILDREN: BIRTH THROUGH ELEVEN YEARS OF AGE

Seventy-four (50 male and 24 female) injuries were reported in children. The main types of fireworks resulting in injury included sparklers (20 cases), rockets (13 cases), and firecrackers (14 cases). Three-fourths of the cases (56 cases) in this age group sustained burns.

The most frequently reported injured area of the body was the eyes (27 cases). Injuries to other body parts included the face/ears/head (16 cases), hands and/or fingers (16 cases), leg (7 cases), arm (6 cases), and trunk (2 cases). Seventy-three percent of injuries happened in the presence of an adult. Twelve of the injured children were bystanders. The majority (96 percent) of those injured were evaluated in hospital emergency departments or health care provider offices. Eight cases (11 percent) were admitted to the hospital.

ADOLESCENTS: TWELVE THROUGH EIGHTEEN YEARS OF AGE

Among adolescents there were 64 fireworks-related injuries, involving 50 males and 14 females. The most frequent type of fireworks involved among this age group were rockets (20 cases), followed by firecrackers (12 cases), and sparklers (7 cases). Burns (64%) and contusions/lacerations/abrasions (30%) were the most frequent types of reported injuries.

Hand and/or finger was the most frequently reported body part injured (22 cases). Injuries to other parts of the body included the face/ear/head (21 cases), eye (21 cases), arm (6 cases), trunk (3 cases), and leg (1 case). Eight cases (13 percent) required hospitalization and eight (13 percent) were transferred to or re-evaluated at more specialized healthcare sites (i.e., burn centers, eye centers).

Among adolescents, 29 injuries (53 percent) occurred while in the presence of an adult. Nine of the injured were bystanders. Although the most frequently reported mechanism of injury involved mishandling of fireworks, 24 people reported injury resulting from malfunctioning or errant paths of fireworks.

ADULTS: NINETEEN YEARS OF AGE AND OLDER

Among adults nineteen years of age and older, 112 people (45 percent of all cases) reported fireworks-related injuries during this reporting period (74 males and 38 females). The types of fireworks primarily involved in injuries were sparklers (23 cases), firecrackers (18 cases), and aerials (17 cases). Roman candles were reported as the cause of nine injuries. Seventy-six percent (85 cases) of adults experienced burn injuries.

Hand injuries accounted for 53 reported cases (47 percent). Injuries also included the eye (25 cases), legs (17 cases), face/ears/head (17 cases), arm (11 cases), and trunk (11 cases). Twelve cases (11 percent) were admitted to hospitals. Twelve cases (11 percent) were transferred to or re-evaluated at more specialized healthcare sites (i.e., burn centers, eye centers).

The use of alcohol was reported by 20 percent (22 cases) of injured adults and 15 consumed alcohol within three hours of the injury. Twenty-one of the injured cases were bystanders. Fifty-five cases reported an injury resulting from malfunctioning fireworks or an errant path of rockets, while 26 reported mishandling of fireworks resulted in injury.